

WHAT IS CLAIMED IS:

1 1. A method of preparing a nucleic acid array on a solid support, said
2 method comprising:

3 a) attaching a plurality of nucleic acids to said support to form an array;
4 and
5 b) drying said array by exposing to a dry atmosphere for a period of at
6 least 30 seconds.

1 2. A method in accordance with claim 1, wherein said attaching
2 comprises a stepwise coupling of nucleic acid monomers to prepare a nucleic acid probe
3 array wherein each of said probes are from 5 to 50 monomers in length and said drying
4 comprises following at least a portion of said stepwise coupling steps with a step of
5 exposing the array to a dry atmosphere for a period of at least 50 seconds.

1 3. A method in accordance with claim 2, wherein said portion is at
2 least about 70% of said coupling steps.

1 4. A method in accordance with claim 2, wherein said portion is at
2 least about 85% of said coupling steps.

1 5. A method in accordance with claim 2, wherein said portion is at
2 least about 95% of said coupling steps.

1 6. A method in accordance with claim 1, wherein each nucleic acid
2 occupies a separate known region of the support, said attaching step (a) further comprises:

3 (i) activating a region of the support;
4 (ii) attaching a nucleotide to a first region, said nucleotide having a
5 masked reactive site linked to a protecting group;
6 (iii) repeating steps (i) and (ii) on other regions of said support whereby
7 each of said other regions has bound thereto another nucleotide comprising a masked
8 reactive site link to a protecting group, wherein said another nucleotide may be the same
9 or different from that used in step (ii);
10 (iv) removing the protecting group from one of the nucleotides bound to
11 one of the regions of the support to provide a region bearing a nucleotide having an
12 unmasked reactive site;

(v) binding an additional nucleotide to the nucleotide with an unmasked reactive site;

(vi) repeating steps (iv) and (v) on regions of the support until a desired plurality of nucleic acids is synthesized, each nucleic acid occupying separate known regions of the support;

wherein at least a portion of said attaching and said binding steps are followed by drying steps wherein said solid support is exposed to a dry atmosphere for a period of at least 50 seconds.

7. A method in accordance with claim 1, wherein said attaching step (a) comprises the sequential steps of:

(i) removing a photoremovable protecting group from at least a first area of a surface of a substrate, said surface comprising immobilized nucleotides on said surface, said nucleotides capped with a photoremovable protective group, without removing a photoremovable protecting group from at least a second area of said surface;

(ii) simultaneously contacting said first area and said second area of said surface with a first nucleotide to couple said first nucleotide to said immobilized nucleotides in said first area, and not in said second area, said first nucleotide capped with said photoremovable protective group;

(iii) removing a photoremovable protecting group from at least a part of said first area of said surface and at least a part of said second area;

(iv) simultaneously contacting said first area and said second area of said surface with a second nucleotide to couple said second nucleotide to said immobilized nucleotides in at least a part of said first area and at least a part of said second area;

(v) performing additional irradiating and nucleotide contacting and coupling steps so that a matrix array of at least 100 nucleic acids having different sequences is formed on said support;

wherein at least a portion of said contacting steps are followed by drying steps wherein said solid support is exposed to a dry atmosphere selected from the group consisting of dry air, nitrogen, argon and mixtures thereof for a period of at least 50 seconds.

8. A method in accordance with claim 7, wherein said portion is at least about 70% of said contacting steps.

1 9. A method in accordance with claim 7, wherein said portion is at
2 least about 85% of said contacting steps.

1 10. A method in accordance with claim 7, wherein said portion is at
2 least about 95% of said contacting steps.

1 11. A method in accordance with claim 9, wherein said array
2 comprises at least 10 different nucleic acids.

1 12. A method in accordance with claim 9, wherein said array
2 comprises at least 100 different nucleic acids.

1 13. A method in accordance with claim 9, wherein said array
2 comprises at least 1000 different nucleic acids.

1 14. A method in accordance with claim 9, wherein said array
2 comprises at least 10,000 different nucleic acids.

1 15. A method in accordance with claim 9, wherein said array
2 comprises at least 100,000 different nucleic acids.

1 16. A method in accordance with claim 9, wherein each different
2 nucleic acid is in a region having an area of less than about 1 cm².

1 17. A method in accordance with claim 9, wherein each different
2 nucleic acid is in a region having an area of less than about 1 mm².